REMARKS

The foregoing amendment and the following arguments are provided to impart precision to the claims, by more particularly pointing out the invention, rather than to avoid prior art.

Drawings

Applicant has labeled Figures 1 and 2 as prior art per the Examiner's suggestion.

Specification

Applicant has amended the specification to comply with the Examiner's request and Applicant now believes that all reference numbers are accurate. No new matter has been added.

35 U.S.C. 121

Applicant elects group 1, claims 1-35 and 42-46 without traverse. Claims 36-41 are withdrawn from consideration.

35 U.S.C. 112, second paragraph Rejections

Examiner rejected claims 1-35 and 42-46 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant has amended claims 1, 15, 19-24, 29, 33, 35, and 43 to comply with the Examiner's request to remove the word "gas". This amendment was made not to overcome the prior art but merely to clarify the claims and does not narrow the claims.

Regarding the Examiner's objection to claim 8, the Examiner contends that references to the integrated circuit in claims 1, 6, and 8 are inconsistent. Applicant respectfully traverses this objection. The reference to the IC in claim 8 is not positive. Rather, the positive reference in claim 8 is the reference to a

thermally conductive paste. Since the paste is *applied* between the exterior surface and the integrated circuit, the reference to the integrated circuit is functional and consistent with the other claims.

As to claims 12 and 25, the Examiner contends that it is inconsistent with claim 1 to create a vacuum. However, the limitations in claim 1 states that the flexible channel is to *allow* a fluid introduced within a conduit to move between the conduit and the flexible channel. Creating a vacuum in the conduit and the flexible channel is entirely consistent with this limitation and therefore claims 12 and 25 need not be amended. Furthermore, a vacuum may be a "high" vacuum in which there is very little fluid or it may be a "low" vacuum in which there is some fluid.

Examiner contends that claim 42 is incomplete and indefinite. Applicant respectfully traverses this rejection. Claim 42 includes a limitation of means for positioning an electronic or electrical device proximate of conduit having a flexible channel attached thereto. Claim 42 further includes a limitation of means for extending the flexible channel until a closed end of the flexible channel contacts the electronic or electrical device. Applicant contends that these limitations are sufficient to describe the cooling device because the electronic or electrical device is positioned proximate a conduit having a flexible channel. The flexible channel is extended to contact the electronic or electrical device. Claim 42 discloses a conduit and a flexible channel, the flexible channel attached to the conduit, and these limitations along with the positioning means and the extending means to bring the flexible channel in contact with an electronic or electrical device are sufficient to describe a cooling device. Therefore Applicant believes that claim 42 is neither incomplete nor indefinite.

35 U.S.C. § 102(b) Rejections

Examiner rejected claims 1-8, 10-11, 15-16, 18-23, 42 and 44 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 4,920,574 (hereinafter "Yamamoto").

Independent claim 1 includes a limitation of flexible channel comprised of a resilient material having spring-like characteristics, the material to provide a spring-like restoring force when compressed. Yamamoto does not teach such a limitation. Instead Yamamoto teaches a cooling device having a bellows where the bellows is pressed against an electronic circuit component by means of the hydraulic pressure of the coolant found inside the bellows (Col. 4, lines 59-62). Further, Yamamoto teaches where a heat transfer plate is adhered to an electronic component by soldering or die bonding (Col. 4, line 67 through Col. 5, line 2). Yamamoto does not expressly disclose where a flexible channel is comprised of resilient material. The heat transfer plate which contacts an electronic circuit component in Yamamoto is held to the circuit either by hydraulic pressure or by adhesive force (Col. 4, lines 59-62, Col. 4, line 67-Col. 5, line 2).

A bellows does not necessarily have to be resilient, a bellows may be constructed such that it is necessary for a force to act upon the bellows in order to contract or expand the bellows. Further, Yamamoto teaches that using a spring to press a heat sink head against a circuit component may lead to unpredictable changes in thermal transfer resistance, and therefore the use of solder as an adhesive to bond a heat sink head to circuitry component is preferable (Col. 1, lines 58-63, Col. 2, lines 3-7). Because Yamamoto teaches that using a spring to press a heat sink head against circuitry is disadvantageous, that using hydraulic pressure to press the heat sink head against the circuitry is required, and that using an adhesive is necessary to hold the heat sink head against circuitry, Yamamoto does not teach a flexible channel comprised of a

resilient material having spring-like characteristics, and Yamamoto does not anticipate claim 1. Further, in view of Yamamoto's comments about the spring being disadvantageous and about the need for an adhesive, Yamamoto teaches away from the pending claims.

Examiner rejected claims 1-8, 10-11, 15-16, 18-22, 42 and 44 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,195,020 (hereinafter "Suzuki").

Claim 1 includes a limitation of a flexible channel comprised of a resilient material having spring-like characteristics, the material to provide a spring like restoring force when compressed. Suzuki does not teach such a limitation. Rather, as illustrated in Figures 5A and 5B, Suzuki teaches bellows that are compressed by using a base plate jig and expanded using a pushing jig. Since a bellows may require outside force to expand and contract, and Suzuki teaches outside force to expand and contract a bellows, there is no suggestion that the bellows taught by Suzuki is resilient.

Further, the printed circuit board taught by Suzuki is held by, and fastened to a flange (Col. 7, lines 46-48). Suzuki also teaches where grease and pressure applied by a moveable base table jig or a pushing jig are necessary to fasten a heat transfer plate to circuitry for a cooling device to remove heat from an integrated circuit (Col. 7, lines 30-54). Therefore, the printed circuit board is fastened to a flange and the circuitry mounted upon the circuit board is adhered to the bellows, implying that the only force holding the bellows in place is whatever force is fastening the circuit board to the flange, and the adhesive force of the grease.

Suzuki further teaches that change in pressure of a spring can result in loss of a heat transfer efficiency, and that using a spring to press a heat transfer member against a circuit component is disadvantageous (Col. 1, line 52 through

Col. 2, line 1). Also, as above, and as seen in Figures 5A and 6B, the bellows taught by Suzuki do not have the ability to exert a spring-like force as a base table jig or a pushing jig is necessary to extend or compress the bellows (Col. 7, line 55 thorough Col. 8, line 1). Therefore, external forces and adhesives are necessary to move and position the bellows taught by Suzuki. As a result, Suzuki cannot teach a flexible channel comprised of a resilient material having spring-like characteristics and Suzuki does not anticipate claim 1. Further, Suzuki teaches a way from the present invention view of Suzuki's comments about a spring and about the need for an adhesive.

Claims 2-8, 10-11, 15-16 and 18-22 are dependent from claim 1 and therefore include all the limitations of claim 1. Because claim 1 is not anticipated by Yamamoto or Suzuki these remaining dependent claims are also not anticipated by Yamamoto or Suzuki.

35 U.S.C. § 103(a) Rejections

Examiner rejected claims 9, 12-14, 17, 25-28, 32-35, 43 and 45-46 under 35 U.S.C. 103(a) as being unpatentable over either Suzuki or Yamamoto.

Claims 9, 12-14, 17, 25-28 and 32-35 depend upon claim 1 and include all the limitations of claim 1. Because Suzuki and Yamamoto do not teach all of the elements of claim 1, claims 9, 12-14, 17, 25-28 and 32-35 are patentable over Suzuki and Yamamoto.

Examiner rejected claims 24 and 29-31 under 35 U.S.C. 103(a) as being unpatentable over either Suzuki or Yamamoto taken with U.S. Patent 5,420,753 (hereinafter "Akamatsu").

Claims 24 and 29-31 depend from claim 1 and therefore include all the limitations of claim 1. Neither Suzuki nor Yamamoto include all the limitations

of claim 1. Therefore, claims 24 and 29-31 are patentable over either Suzuki or Yamamoto in view of Akamatsu.

CONCLUSION

Applicant respectfully submits the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call Arlen M. Hartounian at (408) 720-8300.

Authorization is hereby given to charge our Deposit Account No. 02-2666 for any charges that may be due.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: 02·27·2003

Arlen M. Hartounian
Reg. No. 52,997

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025-1026
(408) 720-8300

MARKED UP VERSION OF THE SPECIFICATION

Please amend the specification as follows.

Please replace paragraph 0056 of page 19, with the following rewritten paragraph.

- -**FIG. 9** is a cross-sectional view of another cooling device 900 having a wick [302] 902 therein and having flexible channels 903A and 903B attached thereto, according to another embodiment of the invention. In **FIG. 9**, conduit 301 is positioned above IC's 910 and 911, which are mounted on a PCB 920. In this embodiment, conduit 301 is a heat pipe, e.g. a tubular structure containing a wick [302] 902 and coupled with a reservoir 930. Reservoir 930 may be mounted on or within conduit 301, or may be external to conduit 301 as shown in **FIG. 9**. If external, a pump 932 and a connector (e.g. tube or hose) 933 may be provided to couple reservoir 930 with conduit 301. Reservoir 930 may contain a liquid coolant 931 such as water or similar coolants. The coolant 931 is conveyed by capillary action through wick [302] 902 until it is vaporized by the heat transferred through flexible channels 903A and 903B from IC's [810] 910 and [811] 911 (or other electronic or electrical devices). As the vapor reaches cooler portions of heat pipe 301 (e.g. a heat sink attached to heat pipe 301), it cools, condenses, and the condensation is again conveyed by capillary action through wick [302] 902 to flexible channels 903A and 903B.- -

ATTACHMENT A

Claims 36-41 have been canceled without prejudice.

A marked-up version of the amended claims is as follows:

1. (Amended) A cooling device for removing heat from an integrated circuit, said cooling device comprising:

a conduit;

a flexible channel having a first open end and a second closed end, said first open end coupled with said conduit, said open end having an internal width, said flexible channel comprised of a resilient material having spring-like characteristics, said material to provide a spring-like restoring force when compressed; and

an interconnect mechanism between said conduit and said flexible channel to allow a [gas or a] fluid introduced within said conduit to move between said conduit and said flexible channel.

15. (Amended) A cooling device as in Claim 11, wherein [one of] said fluid [or said gas] is within said flexible channel.

19. (Amended) A cooling device as in Claim 18, wherein [one of said gas or] said fluid is contained within said conduit and said flexible channel.

20. (Amended) A cooling device as in Claim 19, wherein [one of said gas or] said fluid is heated.

21. (Amended) A cooling device as in Claim 19, wherein [one of said gas or] said fluid is cooled.

22. (Amended) A cooling device as in Claim 19, wherein said closed end contacts said integrated circuit and wherein heat from said integrated circuit is dissipated by [said gas or] said fluid contained within said conduit and said flexible channel.

23. (Amended) A cooling device as in Claim 19, further comprising:

a plurality of flow diverters attached within said channel to create turbulence in [said gas or] said fluid.

24. (Amended) A cooling device as in Claim 19, further comprising:

a heat sink attached to an interior surface of said closed end to cause heat absorbed by said closed end to be conducted through said heat sink to [said gas or] said fluid contained within said conduit and said flexible channel.

29. (Amended) A cooling device as in Claim 1, further comprising:

a heat sink attached to an interior surface of said closed end to cause heat absorbed by said closed end to be conducted through said heat sink to [said gas or] said fluid contained within said conduit and said flexible channel.

33. (Amended) A cooling device as in Claim 32, further comprising:

wicking material contained within said heat pipe; and

a reservoir coupled with said heat pipe, said reservoir to contain [one of said gas or] said fluid.

42. (Amended) A cooling device for removing heat from an electronic or electrical device, said cooling device comprising:

means for positioning said electronic or electrical device proximate a conduit having a flexible channel attached thereto; and

means for extending said flexible channel until a closed end of said flexible channel contacts said electronic or electrical device.

43. (Amended) A cooling device as in Claim 42, wherein said means for extending said flexible channel further comprises:

means for introducing [a gas or] a fluid within said conduit and said flexible channel; and

means for creating a pressure within said flexible channel of approximately 1.0 atmosphere.

44. (Amended) A method as in Claim 42, further comprising:

means for compressing said flexible channel until said closed end no longer contacts said electronic or electrical device.